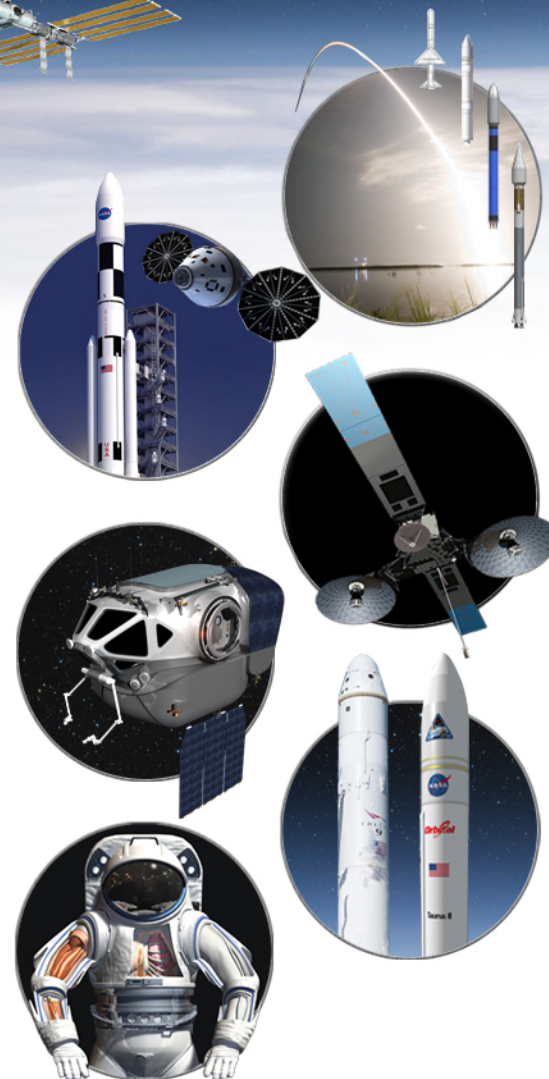




# Commercial Spaceflight Development Update

July 2014  
NAC HEO Committee Meeting  
Philip McAlister

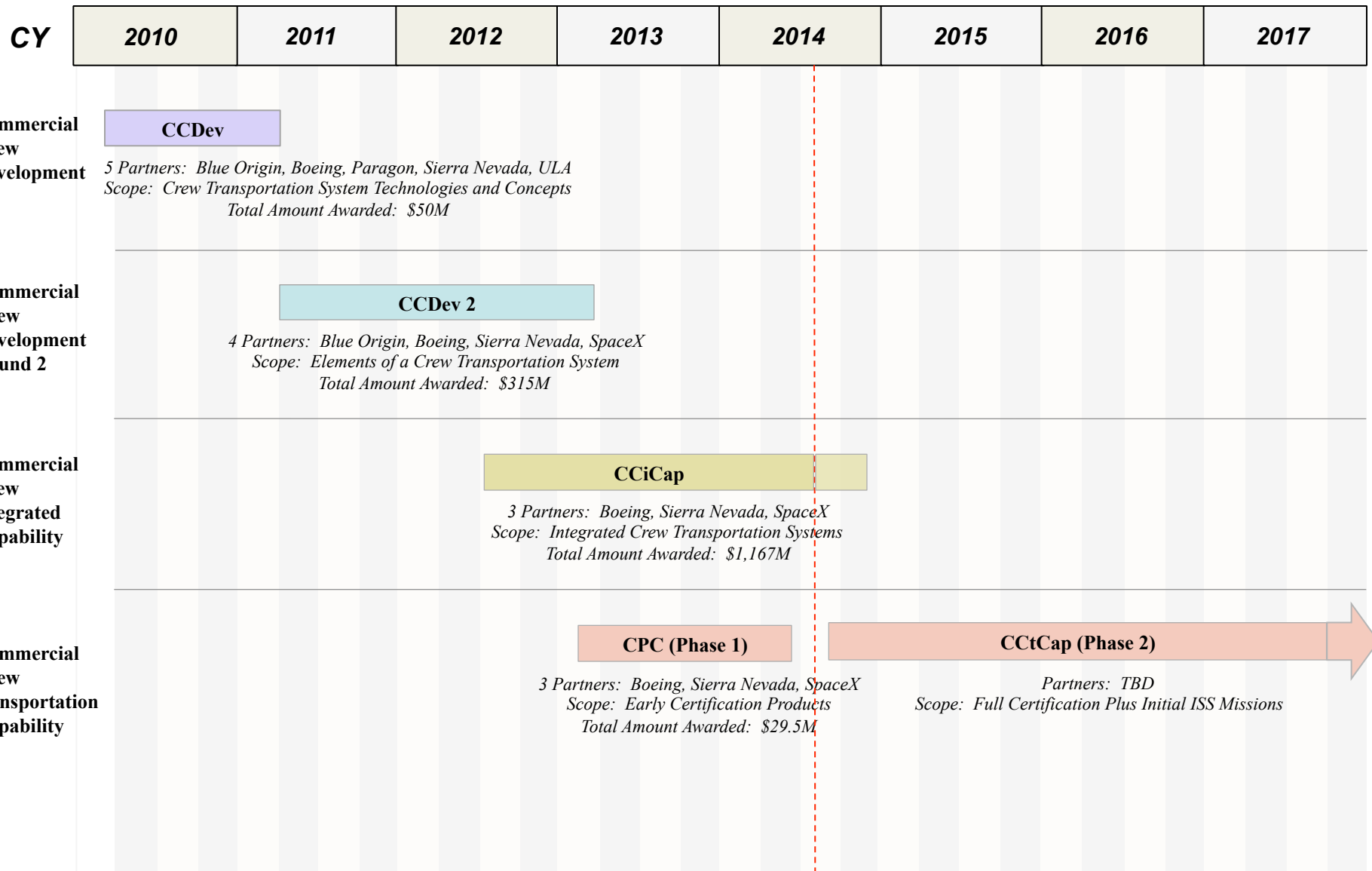


# Current Status



- COTS Cargo has been successfully completed and regular resupply missions to the ISS are in progress.
- Commercial Crew Program is concluding it's final Space Act Agreement phase (CCiCap).
- The contract(s) for the final phase of Commercial Crew development (CCtCap) are planned to be awarded in August/ September of this year.
- Next month, NASA will award multiple no-exchange-of-funds Space Act Agreements for the Collaborations for Commercial Space Capabilities initiative.

# Commercial Crew Acquisition Roadmap



# CCiCap Milestone Status



## • Boeing

- Software Critical Design Review (CDR)
- CDR
- Spacecraft Phase 2 Safety Review Board

Complete

July 2014

July 2014

## • SpaceX

- Integrated Crew Vehicle CDR
- Operations CDR
- Crew Vehicle Technical Interchange Meetings
- Delta Crew Vehicle CDR
- Dragon Primary Structure Qualification
- Pad Abort Test
- In-Flight Abort Test

Complete

Aug 2014

Sept 2014

Nov 2014

July 2014

Aug 2014 U/R

Nov 2014 U/R

## • Sierra Nevada Corporation

- Wind Tunnel Testing
- Main Propulsion & Reaction Control System Testing
- RCS Risk Reduction & Tech Advancement Testing
- RCS Test Incremental Test
- ETA flight testing and free flight

Complete

Complete

Complete

July 2014

Dec 2014



*CST-100 water contingency landing scenario testing.*

*Launch abort engine hot-fire test in California.*



*Astronaut fit-check of the Dragon spacecraft.*

*Dragon test article used for parachute testing.*



*Captive-carry flight of the Dream Chaser engineering test article.*

*First free-flight of the Dream Chaser.*



# Sierra Nevada Progress



A precise scale model of the Dream Chaser spacecraft inside the Unitary Plan Wind Tunnel at LaRC

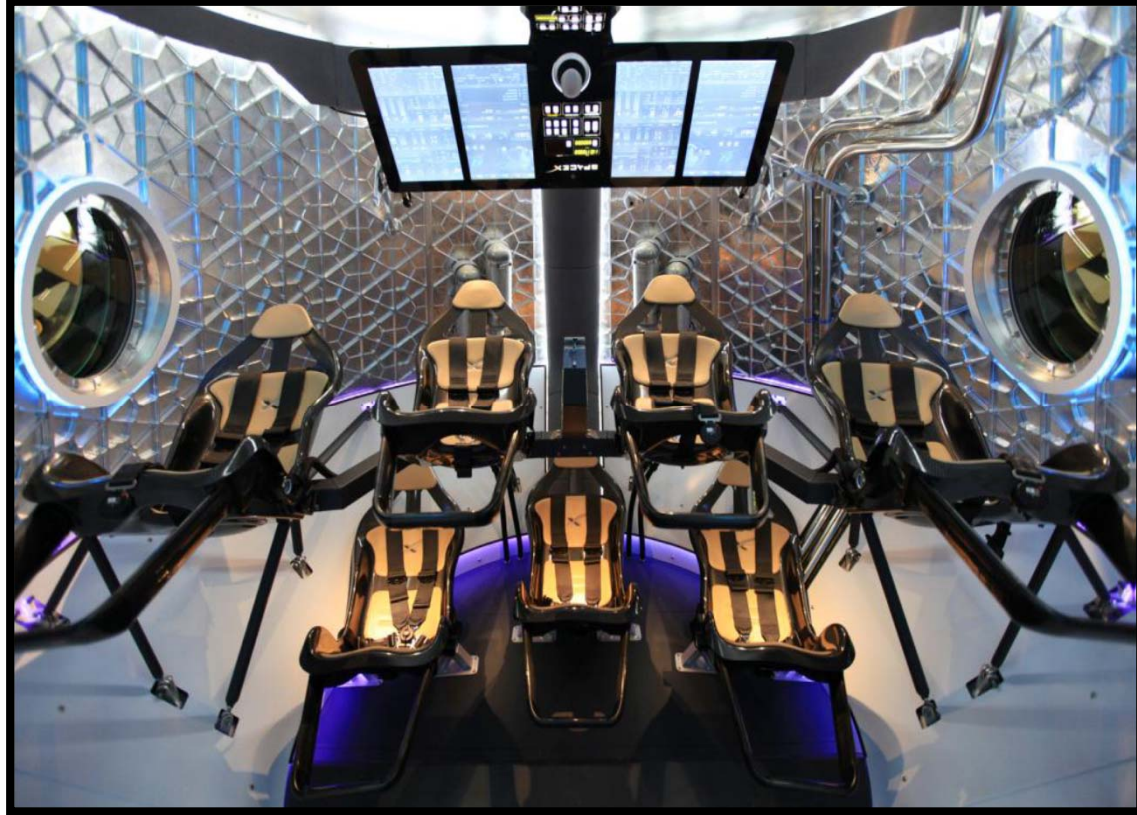
NASA technician works inside the Unitary Plan Wind Tunnel at LaRC to affix grains of sand to a precise scale model of the Dream Chaser spacecraft



# SpaceX Progress



The Dragon V2 stands on a stage inside SpaceX headquarters during its unveiling ceremony



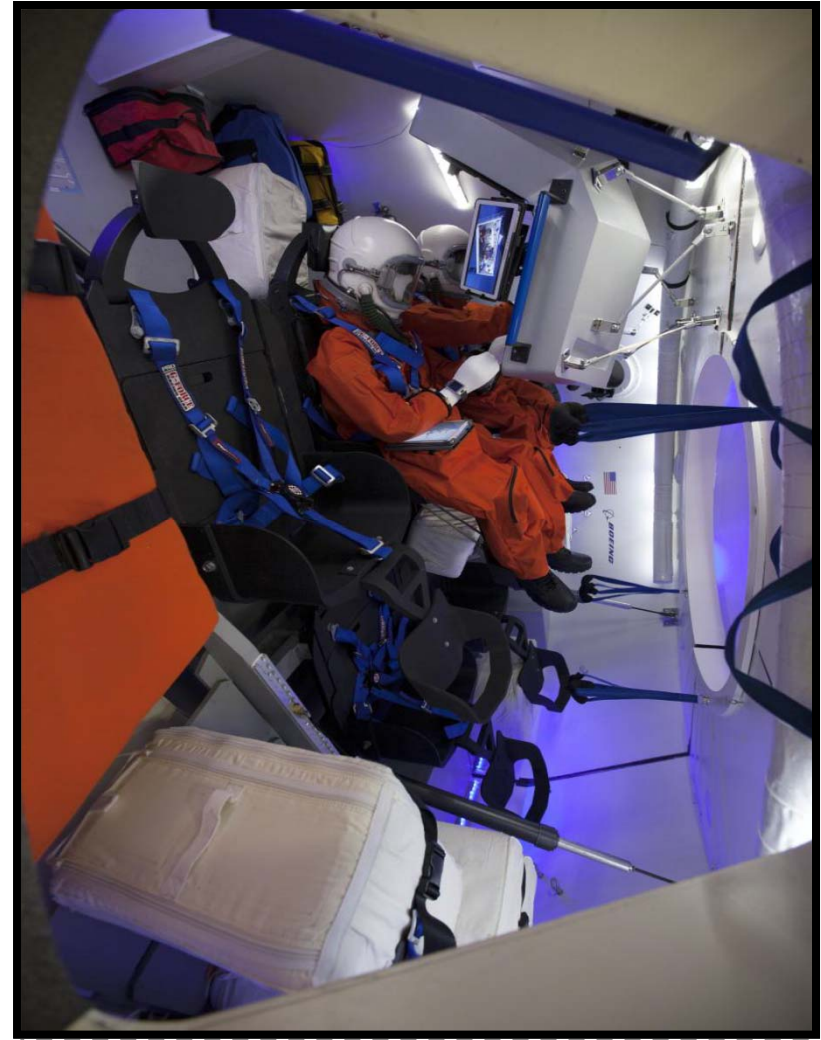
Look through the open hatch of the Dragon V2 reveals the layout and interior capacity



# Boeing Progress

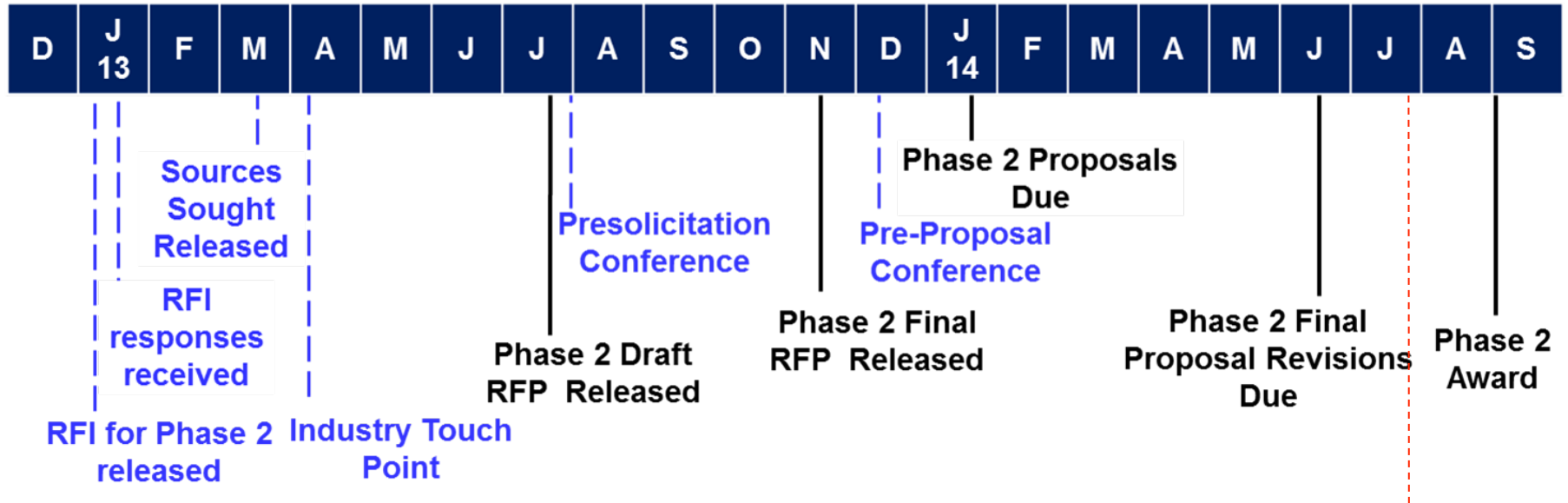


A mock-up of CST-100 shows the exterior during a ceremony inside Orbiter Processing Facility 3



A look inside the CST-100 mock up shows the seating arrangement & other details of the spacecraft

# CtCap Schedule



Sources Sought Released	March 19, 2013
Industry Touchpoint	April 8, 2013
Presolicitation Conference	Aug. 1 & 2, 2013
Pre-Proposal Conference	Dec. 4, 2013

dRFP Release	July 19, 2013
RFP Release	Nov. 19, 2013
Past Performance Due	Jan. 8, 2014
Proposals Due	Jan. 22, 2014
Phase 2 Award	August 2014

Blue text indicates “exchanges” with industry





- Memorandum of Understanding between CCP and the NASA Launch Services Program is in work.
- NASA and FAA Joint Program Management Plan has been signed.
- CCP Office evolving its organizational structure and risk management process to better prepare for CCtCap.
- CCP Standing Review Board is being established.
- Launch & Entry Steering Group established which is a forum for NASA, Air Force, and FAA to establish consistent policy regarding crew safety, range safety, and public.

# CCP Level I Risk Matrix



Likelihood	High	5		
	Moderate		6	1,2,4
	Low			3,7
		Low	Moderate	High
		Consequence		

1. NASA costs may exceed NASA budget →
2. NASA-unique requirements may drive cost →
4. Lack of competition →

5. Technical/budget challenges may delay services →

6. CCtCap contract mechanism may lead to safety/cost risk →

3. NASA culture change may not be successful →
7. Partner(s) may not complete certification →

## Trend

- ↓ Decreasing (Improving)
- ↑ Increasing (Worsening)
- Unchanged
- N New

# Collaborations for Commercial Space Capabilities



## Advancing private-sector integrated space capabilities

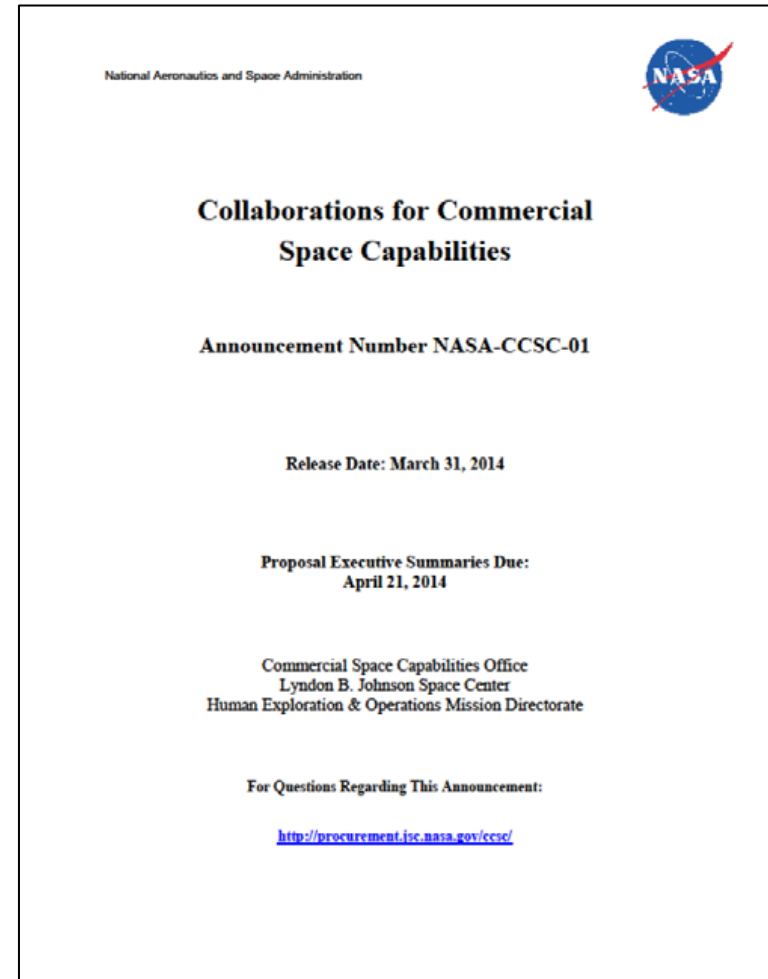
Emerging products or services have potential for commercial availability to government and non-government customers.

## Spurring economic growth as new space markets are created

New capabilities may result in opportunities for industry to provide cost-effective commercial products and services to NASA.

## Current Status

- Evaluating proposals
- Selection in August
- Execution beginning September





- Commercial cargo is demonstrating ISS cargo resupply capability.
- Commercial crew is continuing to advance commercial crew transportation system designs. Significant maturation expected over the next year.
- Collaborations activity may provide an additional partnering opportunity for U.S. private industry.
- Technical, schedule, and budgetary challenges remain for NASA's commercial spaceflight initiatives. However, progress is being made.
- Together with NASA's deep space activities (i.e., Space Launch System and Orion capsule), NASA's human spaceflight program is robust and moving forward.